

Finding your Feet for Fall Prevention

IAYT SYTAR 2019



Can Yoga Reduce Fall Frequency in Elders?- A Pilot Study

Upland Hills
Health

Addition

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Background:

- 1 in 3 people over age 65 will fall each year
- Falls are the leading cause of injury death in adults over the age of 64
- Falls are the most common cause of nonfatal injuries and hospital admissions for trauma over the age of 64
- Yoga has a variety of health benefits:
 - Improved balance
 - Core body strength
 - Proprioception
- There is very little published research about yoga as a fall prevention intervention



Project Design:

- A convenience sample of men and women over age 59 were enrolled
- Intervention:
 - Hatha yoga (Alignment based)
 - Pose focus was on improving core strength and balance
 - An 8 week yoga program of weekly group classes
 - A home yoga practice of 3 poses, 10-15 minutes per day, 3 times per week
- · Evaluation:
 - Balance and strength assessment: 30
 Second Chair Stand and FICSIT-4 (Frailty and Injuries: Cooperative Studies of Intervention Techniques)
 - Pre- and post-intervention surveys including the Tinetti Falls Efficacy Scale

Specific Poses:

 Intervention poses (asana) were recorded for both the home exercise and class participation

Focus poses for classroom and home practice
Core poses were chosen because their effect on: ankle
dorsiflexion(1), hip flexor and extensor muscle(1),
Gastrocnemius, Tibialis and Soleus muscles(2) and hip abductor
including Gluteus Medius(3)

Pose Name	Modifications			
Chair (Utkatasana)	Progression: full chair support, one hand on chair or no support. Small towel under ball of foot as advancement			
High Lunge (Alanasana)	Progression: full chair support, one hand on chair or no support. Advancement: slow transition from one leg balance to fully stepping back			
Tree (Vrksasana)	Progression: full chair, one hand on chair or no support. Advancement: balance foot on floor, calf, thigh			

Poses practiced in every class (a chair was always available for	or
support. Each participant advanced at their own ability for that	t
particular day)	

Pose Name	Pose Name			
Centering	Forward fold (Uttanasana)			
Foundational awareness of bottom of feet	Chair (Utkatasana)			
Body alignment	Arms over head (Urdhva Hastasana)			
Mountain (Tadasana)	Tree (Vrksasana)			
High Lunge (Alanasana)	Relaxation			

Poses used in specific classes (a chair was always available fo	or
support. Each participant advanced at their own ability for that	t
particular day)	

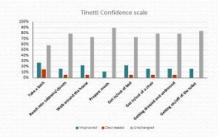
Pose Name	Pose Name
Seated leg lift, knees up (pawanmuktasana)	Standing knee hug (Utthita Hasta Padangusthasana prep)
Seated straight leg lift w/ strap (Padangusthasana)	Balancing straight leg lift. (Utthita Hasta Padangusthasana prep)
Ankle rotation	Dancer (Natarajasana)
Seated eagle arms (Garudasana)	Standing side stretch (Chandrasana I)
Eagle (Garudasana)	Standing twist (Katichakrasana)
Warrior II (Virabhadrasana II)	Seated twist (Bharadvajasana I)
Triangle (Utthita Trikonasana)	Pyramid (Parsvottanasana)
Extended Side angle (Utthita Parsvakonasana)	Reverse warrior (Viparita Virabhadrasana)
Revolve side angle (Parivrtta Parsvakonasana)	Cat/cow (Marjaryasana, Bitilasana)
Down Dog (Adho Mukha	Wide leg forward fold (Prasarita

Results:

- Enrollment: 21 subjects screened, 20 started and 19 (95%) completed
- Assessment: significant changes in 30 Second Chair Stand (P<0.05); no significant changes in FICSIT-4 (P>0.05)



- <u>Fall frequency</u> (previous month): decreased from 4 falls pre-intervention to 1 fall at the end of the intervention, no statistical significance (p = 0.34)
- Confidence domains: there was a nonsignificant trend toward improvement in 8 of 10 domains



- Continuing yoga after intervention:
 yes (79%) no (5%) unsure (16%)
- Home practice: 93.5% completed home exercises
- Attendance: 88.1% of total possible attendance, a mean of 7.1 (STD 1.47) (55%) of subjects attended all classes

Answers Raise More Questions:

- PT Assessment Observation: Does the time of day for pre and post testing or seasonal factors (winter in Wisconsin) cause variation in performance?
- Plateau Effect: Does challenging subjects to progress in pose difficulty increase improvement in balance and decrease falls frequency?
- 15 of 20 subjects (75%) scored 20 or better (28 max)on FICSIT4: With a ceiling effect of FICSIT4, are there better indicators for predicting balance recovery or falls prevention, such as the standing forward reach test?
- 12-14 Hours of Intervention Exercise:
 Sherrington, et al (4)meta analysis reported 50 hours of exercise intervention associated with successful falls prevention programs.
 Can a less time -intense intervention be effective for falls prevention when exercise focuses on core strength and balance?
- Higher Risk Subjects: Would a population with a higher falls risk, such as subjects referred by Physical Therapy because of a fall or subjects reporting at least one fall in the previous month, yield more substantial results in falls prevention assessment?
- Jeter, et al Analysis: Can a randomized trail address issues of "differences in quality of reporting and study design", specifically related to the effectiveness between class room poses, home study poses, sequencing of poses and specific poses (5)
- Plantar Pressure: What is the relationship between balance and awareness of the 4 corners on the bottom of the foot, related to the Yentes, et al analysis (6)

Next Steps:

- A collaborative feasibility study is in progress with UW-Madison: Department of Family Medicine, Wisconsin Institute of Healthy Aging and The Aging and Disability Resource Center of Southwest Wisconsin.
- A wait list randomized trial of yoga's effect for falls prevention, including a potential multi-site collaboration is seeking partners and funding for 2016.



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Yoga's Effect on Falls in Rural, Older Adults; an Academic/Community Partnership

Irene Hamrick, MD. Paul Mross, RYT, LMT, Nate Christopher, PT, OCS, Paul D. Smith, MD



METHODS

We launched a 16 item needs assessment questionnaire to assess interest and feasibility of launching a yoga class in a rural area. A 10 member community advisory board gave us input. We partnered with Aging and Disability Resource Centers of 4 rural counties (pop. 130,078) in Southwest Wisconsin in 2014 to recruit community living older adults for the study.

Inclusion Criteria	Exclusion Criteria
Males and females	Pelvic or lower extremity injury or orthopedic surgery in
Age 60 and older	the previous 12 months.
Able to walk 150 feet	Physician instructions to avoid low intensity exercise.
without assistance	Neurologic condition that impairs strength or balance
Cognitively intact	Not expected to live 6 months or more.
	Practiced yoga in the past 6 months

3 groups of 1 hour Hatha yoga classes twice weekly for 8 weeks. Poses were modified for individuals based on abilities and to increase range of motion. Half of participants were asked to practice yoga exercises for 10 minutes and do relaxation for 5 minutes, the other half was asked to do 5 minutes of relaxation on days without yoga classes and document practice in a log book. The 3 home exercise poses selected from class poses were: Chair (Utkatasana), Tree (Vrksasana) and High or Crescent Lunge (Alanasana). We created a teacher's handbook.

Data Collection at baseline and after class completion. Activities Specific Balance Confidence scale,⁶ Berg Balance Scale,⁷ Functional Gait Assessment⁸ and Dynamic Gait Index.⁹ At baseline number of falls in the past 1 month, 6 months and 1 year. 2 & 4 months after class completion, phone calls assessed falls in the past 6 months.

ACKNOWLEDGEMENT

This study was funded by the Wisconsin Partnership Program

CONCLUSION

This pilot project suggests that yoga classes reduced self-reported falls and improved balance measures. Home practice did not improve most outcomes over class attendance alone. Ceiling effects limited interpretation of some outcomes. Our needs analysis found strong interest in yoga in this rural older population. Yoga can contribute to economic savings and quality of life improvement given the great number of older persons at risk for falls. These findings need to be confirmed in a larger, longer randomized trial.

RESULTS

225 surveys were returned with 11 unusable and 214 included in the **needs analysis**. Cost was listed as the biggest concern about trying yoga

Feedback from the **community advisory board** and initial survey results showed that a twice weekly yoga class was preferred over a weekly class.

Of 43 participants 1 dropped out after 1 class, 1 had an unrelated injury and 1 was on the advisory board

Reported practice at:

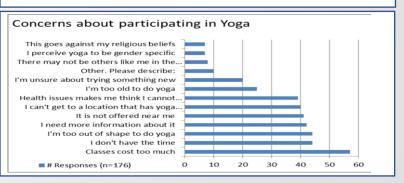
- 2 months: 12 individuals (63%), avg. 2.1 times
- 4 months: 7 individuals (37%), avg. 1.6 times

All improved significantly on falls, Berg Balance, Functional Gait Assessment, Dynamic Gait Index. The only between group difference was on fear of falling, the Activities Specific Balance Confidence scale.

Test (possible points)	Intervention Groups Combined		P-value	Yoga Practice		Relaxation Only		P-value Yoga vs. Relaxation
	Before	After	1	Before	After	Before	After	interactio
Falls, 6 months	26	1	p<.001	11	0	15	1	p=.554
BB Scale (56)	53	54	p=.002	53.7	54.3	51.7	53.4	p=.102
BB time R leg stand, seconds	13.3	17.1	p=.02	18.7	22.7	7.8	11.6	p=.953
BB: Functional Reach Distance	26.0	29.6	p<.001	26.4	30.6	25.5	28.7	p=.414
BB Tandem Stand	3.5	3.7	p=.009	3.7	3.8	3.3	3.7	p=.136
BB: Single Leg Stand	2.5	2.8	p=.013	3.2	3.1	1.9	2.5	p=.119
FGA (30)	22.9	25.8	p<.001	24.0	27.0	21.8	24.6	p=.762
FGA 20 foot gait (seconds)	5.6	5.3	p<.001	5.5	5.1	5.7	5.5	p=.324
Dynamic Gait Index (24)	20.6	22.4	p<.001	21.05	22.79	20.05	22.05	p=.648
ABC Scale total	89.3	91.5	p=.082	88.4	93.4	90.1	89.7	p=.045
ABC Inside Activities score	91.7	93.2	p=.27	91.7	94.6	91.7	91.9	p=.327
ABC Outside Activities score	89.7	90.5	p=.491	89.6	92.7	89.8	88.3	p=.063

48% reduction in fall comparing 6 months prior to intervention to 6 months after the intervention started. 15 individuals having 27 falls dropped to 13 individuals having 14 falls.

Demographic Information (n=214); female	le 154 (72%); Age	, average 4	4 (rai	nge 26-91)		
Survey Questions, Yes/No		No				
Have you practiced yoga for more than 1 i	month in the pas	t? 51 (2	24%)	160 (75%)		
If yes, how long did you practice yoga? Mo	ore than 3 month	ns? 37 (6	52%)	23 (38%)		
Do you know someone who has done yog	a before?		(65%)			
If yes, would you try yoga because of thei	rexperience?	102 ((67%)	28 (18%)		
Do you have access to a yoga class within	a 10 mile radius	95 (4	7%)	53 (26%)		
Survey Questions				N (%)		
If you have practiced yoga in the past, wo	uld you rate you	rexperienc	es as:	68 (100%)		
- Positive				42 (62%)		
 Somewhat positive 				11 (16%)		
- Neutral				9 (13%)		
 Somewhat negative 				5 (7%)		
- Negative				1 (1%)		
How many times have you fallen in the	none	1 Fall		>1 Fall		
- Last month? (N=144)	115 (80%)	18 (12%)		11 (8%)		
 Last 6 months? (N=102) 	78 (76%)	15 (15%)		9 (9%)		
- Last year? (N=101) 58 (57%) 25 (25%) 1						
Would you be more likely to: (1: not very		Likert Scale (SD)				
Attend a yoga class if it was once a week? (N=161) 6.39 (3.56)						
Attend a yoga class if it was twice a week? (N=141) 5.06 (3.36)						
Attend a yoga class if it was 1 hour long? (N=128) 5.75 (3.54						
Attend a yoga class if it was 45 minutes long? (N=142) 6.09 (3.46)						
Attend a class titled • A Balanced Body/Mind? (N=154) 6.06 (3						
Attend a class titled • Flexibility for Health Aging? (N=159) 6.65 (3.08)						
Attend a class titled • Fall Prevention Yoga? (N=150) 5.71 (3.17)						
Attend a class titled • Mindful Movement? (N=145) 5.54 (3.14)						
Attend a class titled • Yoga? (N=138) 6.40 (3						
Attend a class titled • Yoga for Health Aging? (N=167) 6.64 (3						
Practice yoga at home if it was 3 times a week? (N=152) 5.25 (3						
Practice yoga at home if it was every day? (N=132) 4.07 (3						
Practice yoga at home if there were only 3 exercises? (N=136) 5.73 (3.21)						
Practice yoga at home if it took 20 minutes? (N=152) 6.39 (3.23)						
Practice yoga at home if it took 30 minutes? (N=138) 5.63 (3.24) N varies as some respondents did not answer all questions.						

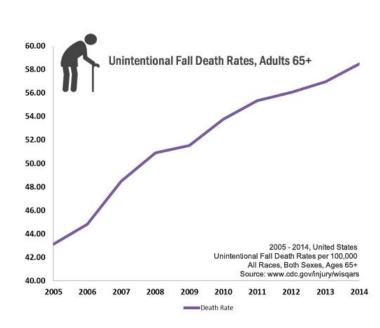


1 in 3 People over the age of 65 fall each year. 1 in 2 over the age of 80!











01

20-30% of those who fall suffer moderate to severe injuries such as lacerations, hip fractures, or head trauma (CDC)

02

Each year in the US, at least 300,000 older people are hospitalized for hip fractures.

More than 95% of hip fractures are caused by falling (CDC)

03

The 1-year mortality rate after a hip fracture is reported to be 14 to 58% (Schnell et al, Geriatric Orthopaedic Surgery & Rehabilitation. 2010)

04

40% of new Nursing Home admissions in Wisconsin had a fall in the last 30 days (WI DHS)



Please	circle	"Yes" or "No" for each statement below.	Why it matters
Yes (2)	No (0)	I have fallen in the past year.	People who have fallen once are likely to fall again.
Yes (2)	No (0)	I use or have been advised to use a cane or walker to get around safely.	People who have been advised to use a cane or walker may already be more likely to fall.
Yes (1)	No (0)	Sometimes I feel unsteady when I am walking.	Unsteadiness or needing support while walking are signs of poor balance.
Yes (1)	No (0)	I steady myself by holding onto furniture when walking at home.	This is also a sign of poor balance.
Yes (1)	No (0)	I am worried about falling.	People who are worried about falling are more likely to fall.
Yes (1)	No (0)	I need to push with my hands to stand up from a chair.	This is a sign of weak leg muscles, a major reason for falling.
Yes (1)	No (0)	I have some trouble stepping up onto a curb.	This is also a sign of weak leg muscles.
Yes (1)	No (0)	I often have to rush to the toilet.	Rushing to the bathroom, especially at night, increases your chance of falling.
Yes (1)	No (0)	I have lost some feeling in my feet.	Numbness in your feet can cause stumbles and lead to falls.
Yes (1)	No (0)	I take medicine that sometimes makes me feel light-headed or more tired than usual.	Side effects from medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I take medicine to help me sleep or improve my mood.	These medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I often feel sad or depressed.	Symptoms of depression, such as not feeling well or feeling slowed down, are linked to falls.
Total			

Add up the number of points for each "yes" answer. If you scored 4 points or more, you may be at risk for falling. Discuss this brochure with your doctor.

www.cdc.gov/injury

www.stopfalls.org

^{*}This checklist was developed by the Greater Los Angeles VA Geriatric Research Education Clinical Center and affiliates and is a validated fall risk self-assessment tool (Rubenstein et al. J Safety Res; 2011:42(6)493-499). Adapted with permission of the authors.

Research says look for programs with these components for fall prevention:

<u>Varied Activity</u>: The best classes include both strength exercises and balance challenges. Class should include a warm-up and activities that become more challenging over time.

<u>Balance</u>: It should be the most important kind of activity. Balance activities should challenge you when you are moving, when multi-tasking and when standing still. Examples include balancing with feet together, heel to toe, one legged standing, reaching, turning and shifting weight.

<u>Strengthen</u>: to improve everyday activities such as carrying groceries or getting up from a chair or toilet. This is important for safe movement BUT improving strength alone is not enough to prevent a fall!

<u>Gait enhancement</u>: to provide awareness and assist with safe movement through balance and strength.

50 hour role for effective fall prevention programs and creating a healthy habit

Sherrington, Whitney, Lord, Herbert, Cumming, Close. Effective Exercise for the prevention of Falls: A Systematic Review and Meta-Analysis. JAGS, December 2008, 56:2234-2243

On average, it takes more than 2 months before a new behavior becomes automatic — 66 days to be exact. And how long it takes a new habit to form can vary widely depending on the behavior, the person, and the circumstances. In Lally's study, it took anywhere from 18 days to 254 days for people to form a new habit.

From: How Long Does it Actually Take to Form a New Habit? (Backed by Science)

By James Clear

Br J Gen Pract. 2012 Dec;62(605):664-6. doi: 10.3399/bjgp12X659466.

Making health habitual: the psychology of 'habitformation' and general practice.

Gardner B¹. Lally P. Wardle J.

PMID: 23211256 PMCID: PMC3505409

Dr. Karyn Purvis of Texas Christian University says, it takes over **400** repetitions to create a synapse in the brain (true learning) without playful engagement

OR

about **12** repetitions to create a synapse when you use play to teach. So, if you really want to effectively and efficiently teach your children (or anyone for that matter), use PLAY!

https://child.tcu.edu/resources/#stha sh.wSxbzwTM.dpbs

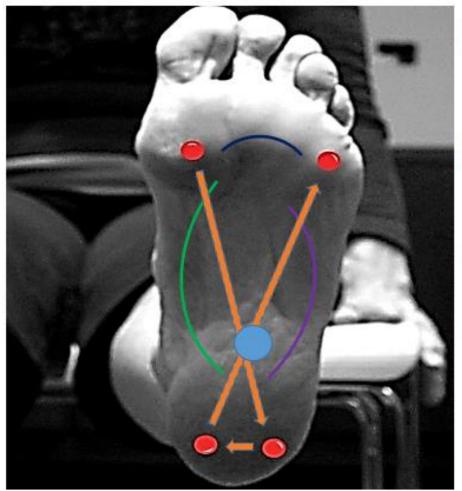
Dance of Shiva



- > Hold on to a chair for balance.
- Step forward with one foot and rock between back and front foot.
- ➤ Increase dance, by balancing on front foot while stepping back foot forward to knee bent and foot slightly off floor. Then return foot back to original spot.
- Continue dance by adding nonchair-supported hand and arm to sequence. Arch that hand and arm over head.
- > Repeat on other side.

Foundation: A Balanced Foot

The bottom of the foot



Four corners of the bottom of the foot

Arches

- Anterior Transverse Arch
- Lateral Longitudinal Arch
- Medial Longitudinal Arch

Kurchashira Marma point

Balancing energy directions (Purva and Pa

10 Paul Mross

Expansion: Awareness of Forward Head Tilt

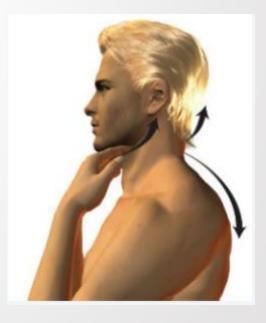
A flexed posture in elderly patients is associated with impairments in postural control during walking.

<u>de Groot MH</u>¹, van der Jagt-Willems HC², van Campen JP³, Lems WF⁴, Beijnen JH⁵, Lamoth CJ⁶.

A flexed posture (FP) is characterized by protrusion of the head and an increased thoracic kyphosis (TK), which may be caused by osteoporotic vertebral fractures (VFs). Impairments in postural control during walking are a major risk factor for falling: the results indicate that patients with FP have impaired postural control during walking and might therefore be at increased risk of falling.







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